

PETITION

Mail Stop Patent Application
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Your Petitioners, Terry Swanson and Larry Swanson, citizens of the United States of America and residents of the State of Nebraska, whose residence and mailing address for Terry Swanson is 2357 Warren Drive, Plattsmouth, Nebraska 68048 and for Larry Swanson is 2357 Warren Drive, Plattsmouth, Nebraska 68048, pray that Letters Patent Protection be granted to them for an

IMPROVED SHOPPING CART WHEEL

as set forth in the following specification:

Background of the Invention

1. Technical Field

The present invention relates to wheels for shopping carts and, more particularly, to an improved shopping cart wheel, including a wheel hub supporting a wheel thereon and having a central axial opening, an first precision bearing unit having a rotating cylindrical central hub, an outer toroidal bearing jacket surrounding the central hub and a plurality of ball bearings rotatably mounted within the bearing jacket for rotatably supporting the central hub there between, an second precision bearing unit similar to the first precision bearing unit, the first and second precision bearing units mounted within the central axial opening of the wheel hub generally contacting one another to provide increased weight capacity and greater side load withstanding capability.

2. Description of the Prior Art

When the average consumer visits a grocery store to purchase groceries, little thought is given to the shopping cart into which the groceries are placed prior to purchase. However, unless the shopping cart functions correctly for the shopper, the entire shopping experience is made much more difficult and it is even likely that the consumer will cease to shop at the particular store where the inconvenience was encountered. Therefore, there is a need to make shopping carts as reliable and maintenance free as possible to increase consumer satisfaction with the shopping experience and decrease maintenance costs to the grocery store.

Of all of the elements of the shopping cart, it is the shopping cart wheels which undergo the most stress and strain during the lifespan of the shopping cart and, in fact, it is the shopping cart wheels which force the retirement of many shopping carts from active duty. Particularly with the proliferation of discount stores such as Sam's Club® and other such wholesale outlets, the amount and weight of groceries being purchased is increasing, thus resulting in additional strain and stress being placed on the shopping cart wheels. Also, due to the high-pressure washing systems used to clean shopping carts, the wheels, and particularly the wheel bearings, are often denuded of lubricant which can decrease the lifespan of the shopping cart wheel. Finally, shopping cart wheels are exposed to a great deal of side stress due to the sliding of the wheels sideways on the floor surface during cornering of the shopping cart, which further increases the stress loads placed on the wheels and wheel bearings of the shopping cart wheel. There is therefore a need for an

1 improved shopping cart wheel which will better withstand the
2 increased weight demands and increased side forces applied to the
3 wheels to increase the lifespan of the wheel and decrease
4 maintenance costs to the grocery store.

5 Various wheels have been proposed in the prior art, such as
6 Hicks, U.S. Patent No. 5,690,395 and Kern et al., U.S. Patent No.
7 5,871,286, each of which attempt to address and solve the problems
8 of increased weight demands and increased wear on the wheels, but
9 do not fully solve either of the problems for various reasons which
10 are inherent in their designs. Consequently, there is still a need
11 for an improved shopping cart wheel which will address and solve
12 the problems not solved by those wheels found in the prior art.

13 Therefore, an object of the present invention is to provide an
14 improved shopping cart wheel.

15 Another object of the present invention is to provide an
16 improved shopping cart wheel which includes two precision bearing
17 units mounted in the central axial opening of the wheel to greatly
18 improve the weight capacity and side load capacity of the wheel.

19 Another object of the present invention is to provide an
20 improved shopping cart wheel in which the first and second
21 precision bearing units are each mounted adjacent opposite ends of
22 the central axial opening of the wheel hub with the central hubs of
23 each of the precision bearing units contacting one another to
24 greatly increase the structural strength of the shopping cart
25 wheel.

26 Another object of the present invention is to provide an
27 improved shopping cart wheel which is superior to those wheels
28 found in the prior art, yet also is relatively economical in

1 construction to permit its widespread use.

2 Finally, an object of the present invention is to provide an
3 improved shopping cart wheel which is relatively simple and
4 inexpensive in construction and is safe, efficient, and durable in
5 use.

Summary of the Invention

The present invention provides an improved shopping cart wheel which includes a wheel hub supporting a wheel thereon and having a central axial opening having inner and outer sides. Mounted within the central axial opening adjacent one end thereof is a first precision bearing unit having a rotating cylindrical central hub, an outer toroidal bearing jacket surrounding the central hub and a plurality of ball bearings rotatably mounted within the outer toroidal bearing jacket and rotatably supporting the rotating central hub therebetween, and mounted within the central axial opening adjacent the opposite end thereof is a second precision bearing unit having a rotating cylindrical central hub, an outer toroidal bearing jacket surrounding the central hub and a plurality of ball bearings rotatably mounted within the outer toroidal bearing jacket and rotatably supporting the rotating central hub therebetween. The central hub of the first precision bearing unit is generally contacting the central hub of the second precision bearing unit within the central axial opening in generally coaxial alignment such that the improved shopping cart wheel will withstand greater side load forces and have increased weight-carrying capacity.

The improved shopping cart wheel as thus described provides several advantages not found in the prior art. For example, the use of the precision bearings will greatly decrease the maintenance needs of the wheel thus increasing the lifespan of the wheel and reducing the maintenance costs for operation of the wheel and hence the cart on which the wheel is mounted. Also, the design and construction of the wheel is such that the cost per unit is kept

1 affordable, which permits the wheel of the present invention to be
2 used in a greater number of situations. Finally, because the
3 improved shopping cart wheel of the present invention provides
4 greater capacity to withstand side load forces without failing and
5 further includes increased weight-carrying capacity, it is superior
6 to those wheels found in the prior art. It is thus seen that the
7 improved shopping cart wheel of the present invention provides a
8 substantial improvement over those devices found in the prior art.

1 **Brief Description of the Drawings**

2 Figure 1 is a perspective view of the improved shopping cart
3 wheel of the present invention mounted on a shopping cart;

4 Figure 2 is a detail perspective view of the improved shopping
5 cart wheel of the present invention; and

6 Figure 3 is a front sectional elevational view of the improved
7 shopping cart wheel showing the precision bearings within the
8 central axial opening of the wheel hub.

Description of the Preferred Embodiment

The improved shopping cart wheel **10** of the present invention is shown best in Figures **1**, **2** and **3** as including a wheel hub **12** on which is circumferentially mounted a wheel **50** which, in the preferred embodiment, would be constructed of metal, plastic such as polyurethane or a rubber compound, depending on the intended use of the shopping cart wheel. In the preferred embodiment, the wheel hub **12** would be molded from a high-impact plastic such as polypropylene and further includes a central axial opening **14** which, in the preferred embodiment, is generally cylindrical in shape extending perpendicularly through the wheel hub **12** in coaxial alignment with the rotational axis of the wheel hub **12**.

Mounted within central axial opening **14** are a pair of precision bearing units, a first precision bearing unit **16** mounted adjacent one side of central axial opening **14** and a second precision bearing unit **26** mounted adjacent the opposite side of central axial opening **14**, as shown best in Figures **2** and **3**. As each of the first and second precision bearing units **16** and **26** are preferably identical, the following description of first precision bearing unit **16** should be understood to apply equally to second precision bearing unit **26**. First precision bearing unit **16** preferably includes a rotating cylindrical central hub **18** which is rotatably mounted within an outer generally toroidal bearing jacket **20**, as shown best in Figures **2** and **3**. The bearing jacket **20** is preferably generally square U-shaped in cross section to provide a channel in which rotatably reside a plurality of ball bearings **22** which rotatably support the central hub **18** therebetween. It is further preferred that the ball bearings **22** be Teflon-coated or the

1 like to minimize friction and also reduce the need for lubrication
2 for the ball bearings **22**. In the preferred embodiment, the central
3 hub **18** would have a diameter of approximately one centimeter and a
4 length of approximately two centimeters, and the diameter of
5 bearing jacket **20** would be approximately two centimeters, although
6 the specific dimensions of the bearing unit elements is not
7 critical to the present invention so long as the functionality of
8 the bearing unit is maintained. For example, it may be preferable
9 to include a larger bearing unit **16** in the case of use of a larger
10 wheel hub **12** to decrease friction and increase the lifespan of the
11 shopping cart wheel **10**.

12 It should be noted that, in the preferred embodiment, central
13 axial opening **14** of wheel hub **12** would include a step configuration
14 wherein the outer ends of central axial opening **14** have a greater
15 diameter than the inner connecting section of central axial opening
16 **14**. The primary purpose for this is to insure that the first and
17 second precision bearing units **16** and **26** fit snugly and securely
18 into the central axial opening **14** to minimize as much as possible
19 wobble motion of the shopping cart wheel **10** when it is mounted on
20 the shopping cart **60**. Of course, it should also be noted that the
21 exact dimensions of the central axial opening **14** may be modified or
22 changed to accommodate various shaped bearing units **16** and **26**
23 merely by modifying the mold from which the wheel hub **12** is
24 produced.

25 The shopping cart wheel **10** of the present invention is shown
26 as being mounted on a shopping cart **60** by a swivel bracket **62**
27 through which a mounting pin **64** is extended, as shown best in
28 Figures **1** and **3**. The mounting pin **64** extends through the central

1 hubs **18** of first and second precision bearing units **16** and **26** such
2 that the improved shopping cart wheel **10** is rotatably mounted on
3 the mounting pin **64** on swivel bracket **62**. Of course, many other
4 types of mounting brackets and systems may be used in connection
5 with the improved shopping cart wheel **10** of the present invention,
6 any of which would be understood by one skilled in the art.

7 It is the unique combination of the first and second precision
8 bearing units **16** and **26** mounted within the central axial opening **14**
9 of wheel hub **12** that render the present invention superior to those
10 wheels found in the prior art. For example, the dual precision
11 bearings permit the shopping cart wheel **10** to support an increased
12 amount of weight over those wheels found in the prior art and,
13 furthermore, because the precision bearings **16** and **26** are mounted
14 adjacent the opposite sides of the central axial opening **14** of
15 wheel hub **12**, improved resistance to side load conditions which
16 tend to damage shopping cart wheels is obtained. Also, the bearing
17 units **16** and **26** are sealed, which means that the incursion of
18 foreign objects into the bearing units **16** and **26** is generally
19 prevented. Finally, because of the relatively simple construction
20 of the shopping cart wheel **10** of the present invention, the cost
21 for construction of the shopping cart wheel is greatly reduced,
22 thus permitting its use in many different situations where such an
23 improved wheel would not otherwise be available for use.

24 It should be noted that it is contemplated to include a
25 plastic cover (not shown) to be mounted on each of the opposite
26 sides of the wheel hub **12** completely covering and enclosing the
27 first and second precision bearing units **16** and **26** to protect them
28 and generally prevent the incursion of contaminants which will

1 degrade the performance of the bearing units, although the exact
2 size and shape of the plastic cover will be determined on a case-
3 by-case basis depending on the structure and format of the wheel
4 itself. Also, it is further contemplated to include a cylindrical
5 steel spanner **30** which extends between and connects the central
6 hubs **18** of first and second precision bearing units **16** and **26** for
7 additional structural strength of the improved shopping cart wheel
8 **10**, and although the inclusion of such a steel spanner unit is not
9 critical to the present invention, it is desirable.

10 It is to be understood that numerous additions, substitutions,
11 and modifications may be made to the improved shopping cart wheel
12 **10** of the present invention which fall within the intended broad
13 scope of the appended claims. For example, the precise size,
14 shape, and construction materials used in connection with the wheel
15 **10** are not critical so long as the functional features described
16 herein are maintained. Furthermore, the precise nature of the
17 first and second precision bearing units **16** and **26** is only somewhat
18 critical to the present invention so long as the units are
19 precision bearing units having the functional characteristics of a
20 precision bearing in order to insure proper functionality of the
21 improved shopping cart wheel **10** of the present invention. Finally,
22 although the present invention has been described for use in
23 connection with shopping carts, it should be noted that the wheel
24 may be used with other types of carts, any of which would be
25 understood by those skilled in the art.

26 There has therefore been shown and described an improved
27 shopping cart wheel **10** which accomplishes at least all of its
28 intended objectives.